

2212

In-head transmitter for CombiTemp- or OEM applications

2212-000#.#

Overview

- Programmable through integrated USB port
- Sensor calibration for either offset, slope or polynomial adjustment
- Accuracy better than 0.1°C for RTD elements
- Automatic cable compensation calibration (2-wire)
- Fast sampling time < 50 ms
- Galvanic isolated
- ATEX and IECEx certified



Technical data

Ambient conditions

Operating temperature range	-40 ... 85 °C
Storage temperature range	-50 ... 85 °C
Degree of protection (EN 60529)	IP 55
Humidity	< 98 % RH , condensing
Insulation voltage	1.5 kV AC

Input signal

Range	Refer to section "Operating conditions"
Connection variants	2-wire 3-wire 4-wire
Measuring unit	°C °F K
Min. measuring span	Refer to section "Operating conditions"
Resolution	17 bit
RTD measuring current	0.16 mA , continuous
Sample time	≤ 0.1 s
Accuracy	Refer to section "Operating conditions"
CJC-compensation	< 0.5 °C , internal < 0.2 °C , external
Input resistance	> 20 MΩ , typ.
Cable resistance	< 30 Ω/wire , 2-wire < 30 Ω/wire , 3/4-wire (T < 700°C) < 15 Ω/wire , 3/4-wire (T > 700°C)
Repeatability	Refer to section "Operating conditions"
Offset adjustment	± 500 °C , max.
Suppression	50 Hz 60 Hz
Protection	± 35 V DC
Error detection delay	< 2.0 s

Output signal

Characteristic	Linear or customised with max. 30 points
Output signal	4 ... 20 mA , 2-wire 20 ... 4 mA , 2-wire
Accuracy	< 0.025 % FSR
Step response time	< 450 ms
Temperature drift	± 0.01 %/K , max.
Load resistance	$R_s \leq (V_{DC} - 7 V) / 0.023 A$
Resolution	14 bit
Up/Down scaling limits	23 mA / 3.5 mA
Ripple immunity	< 1 % , FSR (1 Vrms, 50Hz...1kHz)
Effect of variations in supply voltage	0.001 %/V
Damping	0 ... 60 s

Housing

Style	Compact transmitter, Ø44 mm DIN form B compatible
Overall size	Refer to section "Dimensional drawings"
Material	Polycarbonate

Power supply

Voltage supply range	7 ... 40 V DC , without DFON touch screen 13.5 ... 40 V DC , with DFON touch screen
Power-up time	< 3 s , RTD, Ohm, mV < 5 s , T/C
Reverse polarity protection	Yes

Factory settings

Sensor type class	RTD
Sensor type	Pt100
Connection	2-wire
Unit	°C
Output range	0 ... 100 °C
Damping	0 s

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Technical data

Factory settings

Output at sensor fault 23 mA

IECEX/ATEX II 1G Ex ia IIC T6...T4 Ga

Maximum values for barrier selection, Ui 30 V DC

Maximum values for barrier selection, Ii 95 mA

Maximum values for barrier selection, Pi 750 mW

 Internal capacitance, Ci 11 nF
 26 nF, with DFON touch screen (ATEX only)

 Internal inductance, Li 24 µH
 34 µH, with DFON touch screen (ATEX only)

Temperature class, T1 ... T6 - 40 < Tamb < 56

 Temperature class, T1 ... T5 - 40 < Tamb < 71 °C
 - 20 < Tamb < 60 °C, with DFON touch screen (ATEX only)

 Temperature class, T1 ... T4 - 40 < Tamb < 80 °C
 - 20 < Tamb < 60 °C, with DFON touch screen (ATEX only)

Sensor circuit, Uo 10.5 V DC

Sensor circuit, Io 19 mA

Sensor circuit, Po 55 mW

Sensor circuit, Co 2 µF

Sensor circuit, Lo 94 mH

IECEX/ATEX II 3G Ex nA IIC T6...T5 Gc

Voltage supply range, Un 30 V DC, max.

Current rating, In 20 mA

Temperature class, T1 ... T6 - 40 < Tamb < 31 °C

Temperature class, T1 ... T5 - 40 < Tamb < 80 °C

Sensor circuit, Uo 2.3 V DC

Sensor circuit, Io 0.2 mA

IECEX/ATEX II 3G Ex ec IIC T6...T5 Gc

Voltage supply range, Un 30 V DC, max.

Current rating, In 20 mA

Temperature class, T1 ... T6 - 40 < Tamb < 31 °C

Temperature class, T1 ... T5 - 40 < Tamb < 80 °C

Sensor circuit, Uo 2.3 V DC

Sensor circuit, Io 0.2 mA

Compliance and approvals

 EMC EN 61326-1
 DNV GL - Class A
 EN 50121-3-2:2016

Namur NE21

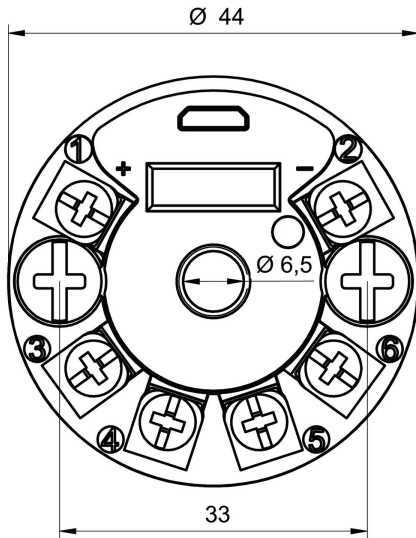
 Explosion protection ATEX II 1G Ex ia IIC T6...T4 Ga
 ATEX II 3G Ex nA IIC T6...T5 Gc
 ATEX II 3G Ex ec IIC T6...T5 Gc
 IECEx Ex ia IIC T6...T4 Ga
 IECEx Ex nA IIC T6...T5 Gc
 IECEx Ex ec IIC T6...T5 Gc

Operating conditions

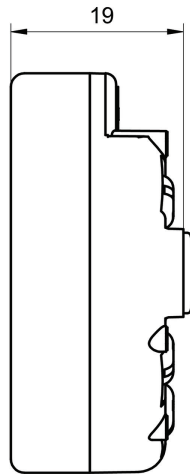
Type	Standard	Measuring range	Min. measuring span	Type	Range	Repeatability	Input accuracy	Input temperature drift (by ambient)
Pt25...Pt1000	DIN/EN/IEC 60751	-200...850°C	10°C	Pt100-Pt200	-200...200°C	≤ ± 0.03°C	≤ ± 0.05°C	≤ ± 0.01 °C/°C change
				Pt100-Pt200	200...850°C		≤ ± 0.06°C	≤ ± 0.015 °C/°C change
				Pt500	-200...200°C	≤ ± 0.07°C	≤ ± 0.14°C	≤ ± 0.04 °C/°C change
				Pt500	200...850°C	≤ ± 0.09°C	≤ ± 0.18°C	≤ ± 0.05 °C/°C change
Pt25...Pt1000	a= 0.003902	-150...650°C	10°C	Pt1000	-200...200°C	≤ ± 0.04°C	≤ ± 0.07°C	≤ ± 0.02 °C/°C change
				Pt1000	200...850°C		≤ ± 0.09°C	≤ ± 0.025 °C/°C change
				Pt100-Pt200	-150...650°C	≤ ± 0.03°C	≤ ± 0.05°C	≤ ± 0.013 °C/°C change
				Pt100-Pt200	200...850°C	≤ ± 0.07°C	≤ ± 0.14°C	≤ ± 0.04 °C/°C change
Pt25...Pt1000	a= 0.003916	-200...720°C	10°C	Pt500	-150...200°C	≤ ± 0.08°C	≤ ± 0.16°C	≤ ± 0.044 °C/°C change
				Pt500	200...650°C	≤ ± 0.08°C	≤ ± 0.16°C	≤ ± 0.044 °C/°C change
				Pt1000	-150...200°C	≤ ± 0.04°C	≤ ± 0.07°C	≤ ± 0.019 °C/°C change
				Pt1000	200...720°C		≤ ± 0.08°C	≤ ± 0.022 °C/°C change
Pt25...Pt1000	a= 0.003920	-200...660°C	10°C	Pt100-Pt200	-200...200°C	≤ ± 0.03°C	≤ ± 0.04°C	≤ ± 0.01 °C/°C change
				Pt100-Pt200	200...660°C		≤ ± 0.05°C	≤ ± 0.013 °C/°C change
				Pt500	-200...200°C	≤ ± 0.07°C	≤ ± 0.14°C	≤ ± 0.04 °C/°C change
				Pt500	200...660°C	≤ ± 0.08°C	≤ ± 0.16°C	≤ ± 0.045 °C/°C change
Ni25...Ni1000	DIN 43760	-60...250°C	10°C	Pt1000	-200...200°C	≤ ± 0.04°C	≤ ± 0.07°C	≤ ± 0.019 °C/°C change
				Pt1000	200...720°C		≤ ± 0.08°C	≤ ± 0.022 °C/°C change
				Pt100-Pt200	-200...200°C	≤ ± 0.03°C	≤ ± 0.05°C	≤ ± 0.01 °C/°C change
				Pt100-Pt200	200...660°C		≤ ± 0.06°C	≤ ± 0.013 °C/°C change
Cu25...Cu1000	0.428 Ohm/°C	-50...200°C	10°C	Pt500	-200...200°C	≤ ± 0.07°C	≤ ± 0.14°C	≤ ± 0.04 °C/°C change
				Pt500	200...660°C	≤ ± 0.08°C	≤ ± 0.16°C	≤ ± 0.045 °C/°C change
				Pt1000	-200...200°C	≤ ± 0.04°C	≤ ± 0.07°C	≤ ± 0.019 °C/°C change
				Pt1000	200...660°C		≤ ± 0.08°C	≤ ± 0.022 °C/°C change
B(PtRh30-Pt)	IEC 584	100...1820°C	200°C	Ni100-Ni200	-60...100°C	≤ ± 0.03°C	≤ ± 0.05°C	≤ ± 0.01 °C/°C change
				Ni100-Ni200	100...250°C		≤ ± 0.04°C	≤ ± 0.006 °C/°C change
				Ni500	-60...100°C	≤ ± 0.06°C	≤ ± 0.11°C	≤ ± 0.03 °C/°C change
				Ni500	100...250°C	≤ ± 0.04°C	≤ ± 0.08°C	≤ ± 0.02 °C/°C change
E(NiCr-CuNi)	IEC 584	-250...1000°C	50°C	Ni1000	-60...100°C	≤ ± 0.03°C	≤ ± 0.06°C	≤ ± 0.015 °C/°C change
				Ni1000	100...250°C	≤ ± 0.02°C	≤ ± 0.04°C	≤ ± 0.01 °C/°C change
				Cu50	-50...200°C	≤ ± 0.04°C	≤ ± 0.08°C	≤ ± 0.02 °C/°C change
				Cu100-Cu200	-50...200°C	≤ ± 0.02°C	≤ ± 0.04°C	≤ ± 0.01 °C/°C change
J(Fe-CuNi)	IEC 584	-210...1200°C	50°C		100...500°C	≤ ± 5°C	≤ ± 10°C	≤ ± 3.3 °C/°C change
					500...1000°C	≤ ± 1°C	≤ ± 2.0°C	≤ ± 0.6 °C/°C change
					1000...1820°C	≤ ± 0.6°C	≤ ± 1.1°C	≤ ± 0.33 °C/°C change
					-250...-40°C	≤ ± 0.5°C	≤ ± 1.03°C	≤ ± 0.3 °C/°C change
K(NiCr-Ni)	IEC 584	-250...1370°C	100°C		-40...150°C	≤ ± 0.1°C	≤ ± 0.19°C	≤ ± 0.06 °C/°C change
					150...1000°C	≤ ± 0.07°C	≤ ± 0.14°C	≤ ± 0.042 °C/°C change
					-210...-40°C	≤ ± 0.25°C	≤ ± 0.52°C	≤ ± 0.16 °C/°C change
					-40...150°C	≤ ± 0.1°C	≤ ± 0.21°C	≤ ± 0.07 °C/°C change
L(Fe-CuNi)	DIN 43710	-200...900°C	50°C		150...1200°C	≤ ± 0.09°C	≤ ± 0.18°C	≤ ± 0.055 °C/°C change
					-250...-40°C	≤ ± 1°C	≤ ± 2.04°C	≤ ± 0.6 °C/°C change
					-40...150°C	≤ ± 0.15°C	≤ ± 0.27°C	≤ ± 0.08 °C/°C change
					150...1370°C	≤ ± 0.13°C	≤ ± 0.25°C	≤ ± 0.075 °C/°C change
N(NiCrSi-NiSi)	IEC 584	-250...1300°C	50°C		-200...50°C	≤ ± 0.17°C	≤ ± 0.33°C	≤ ± 0.1 °C/°C change
					50...620°C	≤ ± 0.1°C	≤ ± 0.20°C	≤ ± 0.06 °C/°C change
					620...900°C	≤ ± 0.09°C	≤ ± 0.17°C	≤ ± 0.05 °C/°C change
					-250...-40°C	≤ ± 1.75°C	≤ ± 3.45°C	≤ ± 1.0 °C/°C change
R(PtRh13-Pt)	IEC 584	-50...1750°C	100°C		-40...500°C	≤ ± 0.2°C	≤ ± 0.40°C	≤ ± 0.12 °C/°C change
					500...1300°C	≤ ± 0.13°C	≤ ± 0.26°C	≤ ± 0.08 °C/°C change
					-50...100°C	≤ ± 1.35°C	≤ ± 2.7°C	≤ ± 0.8 °C/°C change
					100...500°C	≤ ± 0.7°C	≤ ± 1.33°C	≤ ± 0.4 °C/°C change
S(PtRh10-Pt)	IEC 584	-50...1760°C	100°C		500...1750°C	≤ ± 0.45°C	≤ ± 0.9°C	≤ ± 0.28 °C/°C change
					-50...100°C	≤ ± 1.3°C	≤ ± 2.5°C	≤ ± 0.75 °C/°C change
					100...500°C	≤ ± 0.7°C	≤ ± 1.37°C	≤ ± 0.41 °C/°C change
					500...1760°C	≤ ± 0.5°C	≤ ± 1.01°C	≤ ± 0.3 °C/°C change
T(Cu-CuNi)	IEC 584	-250...400°C	50°C		-250...-40°C	≤ ± 0.8°C	≤ ± 1.6°C	≤ ± 0.5 °C/°C change
					-40...100°C	≤ ± 0.15°C	≤ ± 0.29°C	≤ ± 0.09 °C/°C change
					100...400°C	≤ ± 0.1°C	≤ ± 0.21°C	≤ ± 0.065 °C/°C change
					-200...50°C	≤ ± 0.25°C	≤ ± 0.5°C	≤ ± 0.15 °C/°C change
U(Cu-CuNi)	DIN 43710	-200...600°C	50°C		50...300°C	≤ ± 0.13°C	≤ ± 0.25°C	≤ ± 0.08 °C/°C change
					300...600°C	≤ ± 0.09°C	≤ ± 0.17°C	≤ ± 0.05 °C/°C change
					0...1750°C	≤ ± 0.4°C	≤ ± 0.75°C	≤ ± 0.22 °C/°C change
					1750...2310°C	≤ ± 0.55°C	≤ ± 1.09°C	≤ ± 0.3 °C/°C change
W5-Re (Type C)	ASTM 988	0...2310°C	100°C		0...400°C	≤ ± 0.5°C	≤ ± 1°C	≤ ± 0.3 °C/°C change
					400...1200°C	≤ ± 0.26°C	≤ ± 0.52°C	≤ ± 0.16 °C/°C change
					1200...2300°C	≤ ± 0.5°C	≤ ± 1°C	≤ ± 0.3 °C/°C change
					1200...2300°C	≤ ± 0.5°C	≤ ± 1°C	≤ ± 0.3 °C/°C change
Linear voltage			5 mV		-140...140 mV	≤ ± 0.005 mV	≤ ± 10 µV	≤ ± 0.007 mV/°C change
					-500...2000 mV	≤ ± 0.1 mV	≤ ± 125 µV	≤ ± 0.04 mV/°C change
					5 Ω	≤ ± 0.007 Ω	≤ ± 15 mΩ	≤ ± 0.004 Ω/°C change
					0...820 Ω	≤ ± 0.015 Ω	≤ ± 30 mΩ	≤ ± 0.007 Ω/°C change
Linear resistance			50 Ω		0...7000 Ω	≤ ± 0.15 Ω	≤ ± 250 mΩ	≤ ± 0.07 Ω/°C change

Dimensional drawings (mm)

Housing



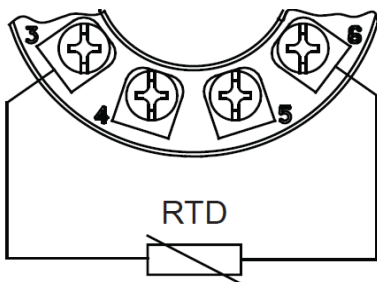
Front view



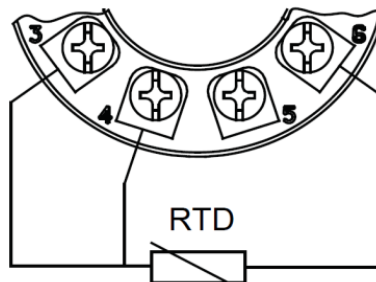
Side view

Electrical connection

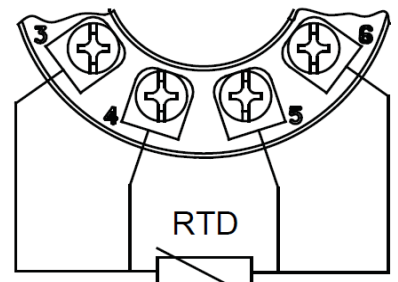
RTD



No cable compensation

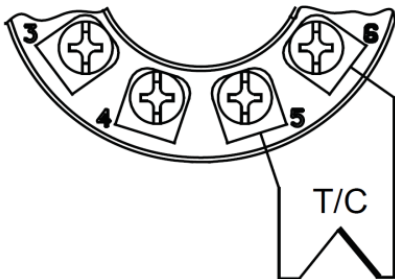


3-wire cable compensation

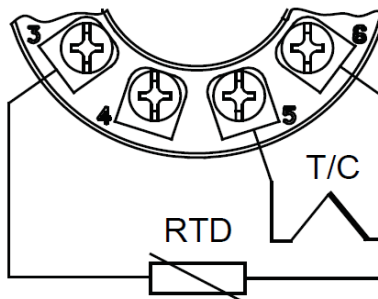


4-wire cable compensation

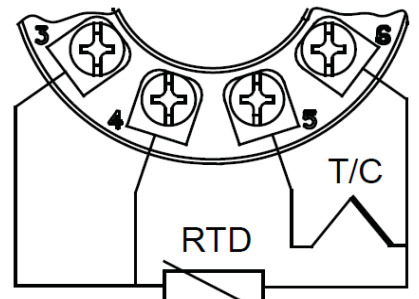
T/C



Internal CJC-compensation



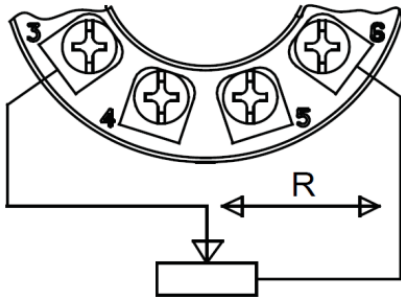
External CJC-compensation, no cable compensation



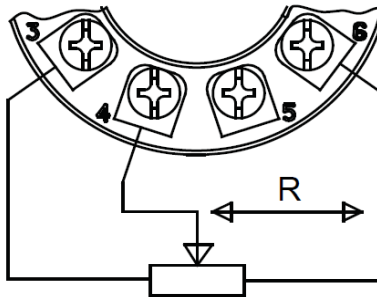
External CJC-compensation, 3-wire cable compensation

Electrical connection

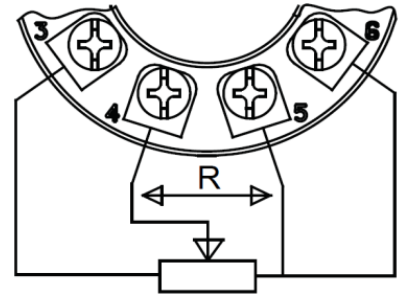
Potentiometer



No compensation

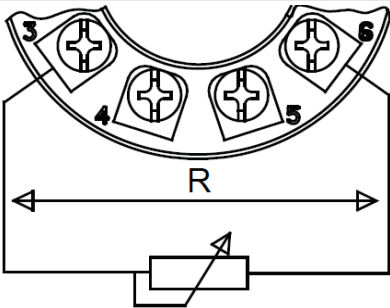


3-wire compensation for transfer resistance

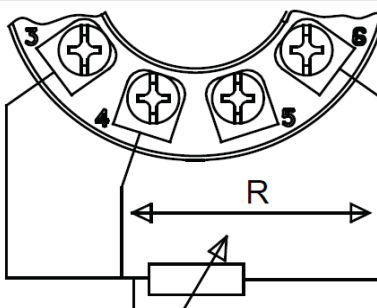


4-wire compensation for transfer resistance

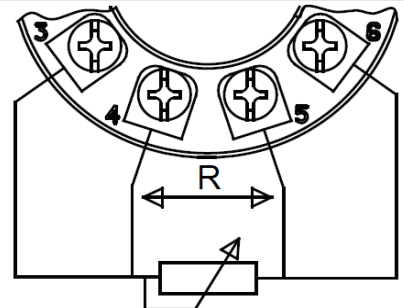
Resistance



No compensation

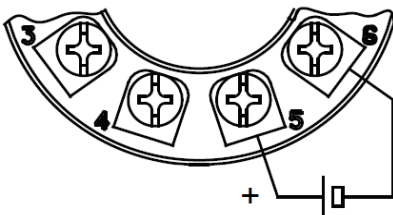


3-wire cable compensation

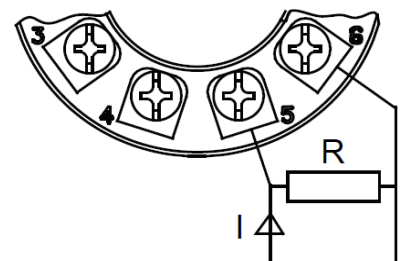


4-wire cable compensation

Voltage measurement



Current measurement



Ordering information

Ordering key - Configuration possibilities see website

	22	12	-	####	.	#
Product	22					
Type						
Universal input / 4-20 mA out / USB		12				
Safety						
Standard						0001
IECEX / ATEX ia						0002
IECEX / ATEX nA						0003
IECEX / ATEX ec						0004
Configuration						
None						0
Programmed acc. to customer specification						C